Processing Fee/Handling Fee Cost Survey

2014 Handling Fee Final Report

California Department of Resources Recycling and Recovery

March 14, 2014

Contractor's Report
Produced Under Contract By:
Crowe Horwath

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March 14, 2014

Ms. Amy Yhnell
Department of Resources Recycling and Recovery
(Division of Recycling, Recycling Program Operations Branch)
801 K Street, 17th Floor
Sacramento, California 95814

Regarding: **Handling Fee Final Report**

Dear Ms. Yhnell:

On behalf of all the team members who worked on the Processing Fee and Handling Fee Cost Surveys, Crowe Horwath LLP (Crowe) is pleased to submit this Handling Fee Final Report. The cost survey was performed under contract by Crowe for CalRecycle.

This fourth-ever handling fee cost survey was a major primary-data, economic cost survey of California certified recycling centers. This survey was used to estimate California statewide, weighted-average, 2012 certified recycler costs per container for recyclers that do not receive handling fees (processing fee recyclers), and recyclers that do receive handling fees (handling fee recyclers). Recycler center costs were surveyed in 2013, using recycler center calendar year 2012 financial statements. Recycler center costs measured by this survey may be used for the handling fee calculation, effective July 1, 2014.

This Handling Fee Final Report describes the tasks conducted by Crowe in completing the handling fee cost survey. The Final Report includes a description of: (1) the cost survey methodology, and (2) cost per container calculations and results.

The Crowe team appreciates the opportunity to conduct this major economic cost survey for CalRecycle. Formulating handling fees is a large cost-accounting and statistical challenge, rivaling the technical requirements of state-of-the-art, activity-based costing techniques and statistical survey methodologies, used by private industry.

A project of this magnitude requires a high degree of communication and collaboration by all involved. We wish to thank CalRecycle management and staff for their support throughout this entire project. If you have any questions concerning this draft report, please feel free to contact either myself, or Ms. Wendy Pratt, at (916) 495-5173, in Sacramento.

Very truly yours,

Edward R. Kaempf

Edward R. Kaempf
Director

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CalRecycle

Executive Summary

Executive Summary

The processing fee and handling fee cost surveys were performed under contract by Crowe Horwath LLP (Crowe), for the California Department of Resources Recycling and Recovery (CalRecycle). This Handling Fee Final Report provides estimates of the statewide, weighted-average cost per beverage container to recycle for recycling centers that do not receive handling fees (processing fee recyclers), and recycling centers that do receive handling fees (handling fee recyclers). This report also summarizes the tasks Crowe, and their subcontractors, conducted in order to obtain the final, statewide, weighted-average costs per container.

This executive summary is organized as follows:

A. Handling Fee Cost Survey Background
B. Handling Fee Cost Survey Objectives
C. Handling Fee Cost Survey Results
D. Handling Fee Cost Survey Tasks.

A. Handling Fee Cost Survey Background

In 1986, the Legislature enacted the California Beverage Container Recycling and Litter Reduction Act (Assembly Bill (AB) 2020). This “bottle bill” program is the only one of its kind in the nation in terms of its unique program structure.

A major subprogram within AB 2020 is the convenience zone system. AB 2020 established specific goals for convenient recycling in order to allow consumers to redeem their containers and receive back their refund value. A traditional deposit system requires beverage retailers (dealers) to accept and sort returned empty containers. However, part of the compromise behind AB 2020 was to develop a mechanism to avoid, or minimize, dealer take-back requirements, which were viewed as costly and unwieldy. While California had about 500 pre-existing recycling centers, these were not deemed adequate to ensure convenient recycling opportunities, because many of these sites did not accept all materials and/or were in non-convenient industrial locations.

Rather than requiring all dealers to accept empty containers, AB 2020 established redemption centers close to where people shopped. Thus was born the “convenience zone,” defined as the area within a one-half mile circular radius surrounding each supermarket in California with annual sales exceeding $2 million.[1] Each convenience zone (CZ) was to contain at least one recycling center that redeemed all types of beverage containers, and was to be open at least 30 hours per week, including at least five off-business hours. If a recycling center was not established within a zone, then all dealers within the zone would be required to take back containers. Through this mechanism, the law created incentives for dealers to ensure that a recycling center was located in their zone.

The intent of AB 2020 was to balance equity, efficiency, and effectiveness in providing recycling opportunities. The convenience zone mandate was established to be equitable, i.e., providing consumers with an easy mechanism to return their redemption value. At the same time, this mechanism was intended to be more efficient and effective than a traditional deposit system.

The CZ system has proven to be equitable, and it is significantly more efficient and cost-effective than in-store dealer take-back. However, conventional wisdom is that recycling in convenience zones on average costs more than recycling at pre-existing recycling centers.

[1] This definition is still in place today.

A major issue that has surrounded convenience zones over the program's 27 years is based around the question: *How much should the state pay for convenience?* As a result, the issue of subsidizing recycling centers in convenience zones has led to frequent legislative adjustments over the history of the program, and continuing most recently with AB 3056, signed into law in September 2006.

Initially, AB 2020 included a "safety net," Convenience Incentive Payments (CIPs), to help pay the cost of recycling centers located in CZs. CIPs were paid from unredeemed funds. Only sites that were the sole redemption location in a zone, and that realized a net average monthly financial loss, were eligible. However, in the early program years, up to two-thirds of new CZ redemption centers received CIPs. Realizing that CIPs were becoming the norm, rather than the exception, the Legislature adopted restrictions on CIP amounts and how they were allocated. The biggest concern with the CIP system was that it was "needs based," and discouraged improvements in operating efficiency.

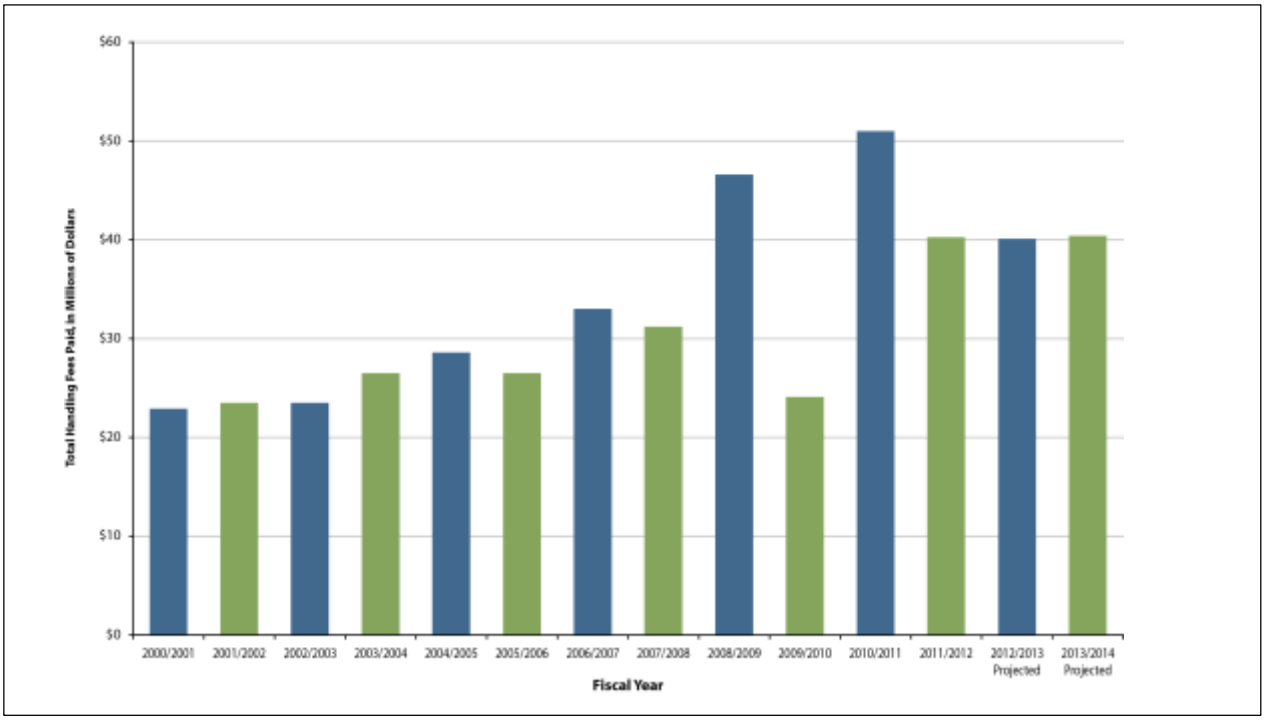
In 1992, AB 87 enacted a number of major changes to the still-young AB 2020 program. One of the most significant changes was the elimination of the CIP, and the establishment of a "performance-based" 1.7-cent per container handling fee to pay for the cost of convenience at CZ sites. AB 87 provided for handling fee payments of up to $2,300 per month, per site, with priority going to those sites with the highest eligible monthly containers. To be eligible, sites had to be: (1) the only recycling center in a convenience zone, (2) be located at, or in, the parking lot of the supermarket, and (3) meet specified total monthly redemption containers, initially 45,000 containers per month, increasing to 60,000 containers per month in January, 1994. Further, to ensure that sites receiving handling fees were recycling adequate glass and plastic, AB 87 required that glass and plastic must be at least 30 percent of a site's eligible containers. The total amount allocated for handling fees was set at $18.5 million per year.

With the exception of changes to the amount of total funding, this basic handling fee system was in place between 1993 and 2008, as a means to help pay for the cost of convenient recycling, with only relatively modest modifications. Until July 1, 2008, handling fee eligibility requirements were as follows:

- Eligible sites included: recycling centers at supermarket sites, nonprofit convenience zone recyclers, or rural regional recyclers.[2]
- Recycling centers must have recycled at least 60,000 containers in the calendar month for which they were paid, or at least an average of 60,000 containers per month during the previous 12 months (a container 24 ounces, or more, counted as two containers).
- The number of containers eligible for handling fees was determined by dividing the site's monthly glass and plastic containers by the monthly all containers recycled. If this quotient was at least equal to 10 percent, the total monthly containers of the site were eligible for handling fees. If the quotient was less than 10 percent, then the maximum eligible containers were determined by dividing the glass and plastic containers by 10 percent. Given high rates of plastic recycling, essentially all recyclers met this eligibility requirement.
- The per container handling fee was 1.8 cents, and the monthly handling fee payment per site did not exceed $2,300.
- If there were not adequate total monthly funds allocated to pay all eligible handling fee sites, then sites with higher monthly eligible containers receive priority for payments.

[2] These categories of recycler are defined in statute: a supermarket site means any certified recycling center which redeems all types of beverage containers in accordance with Section 14572, and which is located within, or outside and immediately adjacent to the entrance of, or at, or within a parking lot or loading area surrounding, a supermarket which is the focal point of a convenience zone, or a dealer that is located within that zone, and which is accessible to motor traffic (Section 14526.5). A nonprofit convenience zone recycler means a recycling center that is operated by an organization established as a 501(c) or 501(d) entity in U.S. Code, is certified by the Department, and is located within a convenience zone, but is not necessarily a supermarket site (Section 14514.7). A rural regional recycler means an operator that is certified by the Department as being in a nonurban area identified using Farmers Home Loan Administration criteria, or is within an area designated by the Department as a rural region with a population of between 10,000 and 50,000 persons (Sections 14525.5.1 and 14571).

Figure ES-1
Total Annual Handling Fee Payments (FY 2000/2001 through Projected FY 2013/2014)



- Handling fee payments were made to only one certified recycling center in a convenience zone. If a dealer was in two zones, only one payment would be made to a recycler located at that dealer. If another recycler was operating in a zone without receiving handling fee payments, the Division did not pay handling fees to a convenience zone recycler in that zone, and neither did the other recycler receive handling fees
- There were separate eligibility criteria for rural region recyclers, related to hours of operation, operation in more than one zone, and location of other recyclers
- Total annual handling fee payments in fiscal year 2006/2007 were capped at $33 million, and for fiscal year 2007/2008 were capped at $35 million.

AB 3056, Statutes of 2006, implemented the most significant changes to the handling fee system since 1993. These changes started with the 2006 handling fee cost survey, and the new approach to handling fee calculations and payments. Effective July 1, 2008, provision for the maximum annual funding cap were removed (constrained only by available unredeemed funds); the 60,000 minimum containers per month was removed; the $2,300 maximum per month was removed; the 1.8 cents per container was removed; and counting containers 24 ounces and above as two containers was removed. **Figure ES-1,** above, provides a historical comparison of annual handling fee payments, starting with fiscal year 2000/2001.

AB 3056 requires CalRecycle to conduct a handling fee cost survey every two years, in conjunction with the processing fee cost survey. Section 14585, subdivision (f) was added to the Beverage Container Recycling and Litter Reduction Act on Sept. 30, 2006, as follows:

"(f)(1) On or before January 1, 2008, and every two years thereafter, the department shall conduct a survey of a statistically significant sample of certified recycling centers that receive handling fee payments to determine the actual cost incurred for the redemption of empty beverage containers by those certified recycling centers. The department shall conduct these cost surveys in conjunction with the cost surveys performed by the department pursuant to subdivision (b) of Section 14575 to determine processing payments and processing fees. The department shall include, in determining the actual costs, only those allowable costs contained in regulations adopted pursuant to this division that are used by the department to conduct cost surveys pursuant to subdivision (b) of Section 14575.

(2) Using the information obtained pursuant to paragraph (1), the department shall then determine the statewide weighted-average cost incurred for the redemption of empty beverage containers, per empty beverage container, at recycling centers that receive handling fees.

(3) On and after July 1, 2008, the department shall determine the amount of the handling fee to be paid for each empty beverage container by subtracting the amount of the statewide weighted-average cost per container to redeem empty beverage containers by recycling centers that do not receive handling fees from the amount of the statewide weighted-average cost per container determined pursuant to paragraph (2).

(4) The department shall adjust the statewide average cost determined pursuant to paragraph (2) for each beverage container annually to reflect changes in the cost of living, as measured by the Bureau of Labor Statistics of the United States Department of Labor or a successor agency of the United States government.

(5) The cost information collected pursuant to this section at recycling centers that receive handling fees shall not be used in the calculation of the processing payments determined pursuant to Section 14575."

The handling fee cost survey described in this report is the fourth of the every-two-year surveys to determine costs per container. This handling fee cost survey was conducted in parallel with the processing fee cost survey, which was used to determine costs per ton for aluminum, glass, PET #1, and HDPE #2, as well as calculate estimated costs to recycle for bi-metal and plastics #3 to #7. Results of the processing fee cost survey are described in a separate report.

Together, the processing fee and handling fee cost surveys performed in 2013 represented one of the largest cost survey efforts undertaken by CalRecycle, to-date. In total, the Crowe team completed 320 recycler cost surveys, comprised of surveys of 218 processing fee recyclers, and surveys of 102 handling fee recyclers. The combined processing fee and handling fee cost surveys also were similar in detail and complexity to prior cost surveys in terms of quantitative information obtained.

B. Handling Fee Cost Survey Objectives

The objective of the handling fee cost survey was to estimate the California statewide, weighted-average, 2012 certified recycler cost per container to recycle for handling fee recyclers and processing fee recyclers. Recycler center costs were surveyed in 2013, using recycler center calendar year 2012 financial statements. Based on the current statute, beginning July 1, 2014, the per container handling fee payment for eligible supermarket sites, nonprofit convenience zone recyclers, and rural recyclers, will be based on the calculated measured difference between the cost per container for these two populations (i.e., handling fee recycler cost per container, minus processing fee recycler cost per container).

The recycler costs per container presented in this report culminate 10 months (April 2013 through January 2014) of research, development, and implementation effort on a primary data economic cost survey of California certified recycling centers. The actual cost survey field work was performed over the nine-month time period, from April through December 2013).

Table ES-1
Statewide Recycler Costs per Container (2012)
Handling Fee Cost Survey

Recycler Type	2012 Statewide, Weighted Average, Cost per Container	Percentage Change (PF to HF Cost per Container)	Error Rate at 90 % Confidence Interval
1. Handling Fee Recycler	2.440 Cents	+73.67%	4.37%
2. Processing Fee Recycler	1.405 Cents	n/a	6.30%
3. Handling Fee Recycler Cost per Container minus Processing Fee Recycler Cost per Container	1.035 Cents	n/a	n/a

C. Handling Fee Cost Survey Results

The statewide, weighted-average, recycler cost per container for handling fee recyclers and processing fee recyclers are presented in **Table ES-1,** above. The statewide, weighted-average, cost to recycle for handling fee recyclers in 2012 was 2.440 cents per container, 74 percent higher than the statewide, weighted-average, cost to recycle for processing fee recyclers in 2012, at 1.405 cents per container.

Table ES-1 includes the new handling fee payment calculation, 1.035 cents per recycled container, equal to the difference between the handling fee recycler statewide, weighted-average, cost per container to recycle, and the processing fee recycler statewide, weighted-average, cost per container to recycle, as specified in Section 14585 (f)(3), of the Beverage Container Recycling and Litter Reduction Act. CalRecycle is scheduled to implement this new handling fee payment of just over one-cent per container starting July 1, 2014.

The sample sizes used to determine the costs per container were estimated to achieve a 90 percent confidence interval. This standard was higher than the statistical requirements in regulations for handling fee survey cost per container calculations, which specify an 85 percent confidence interval. The cost per container results for both handling fee recyclers and processing fee recyclers presented in this report exceeded this target, with low error rates at the 90 percent confidence level of 4.37 percent, and 6.30 percent, respectively.

D. Handling Fee Cost Survey Tasks

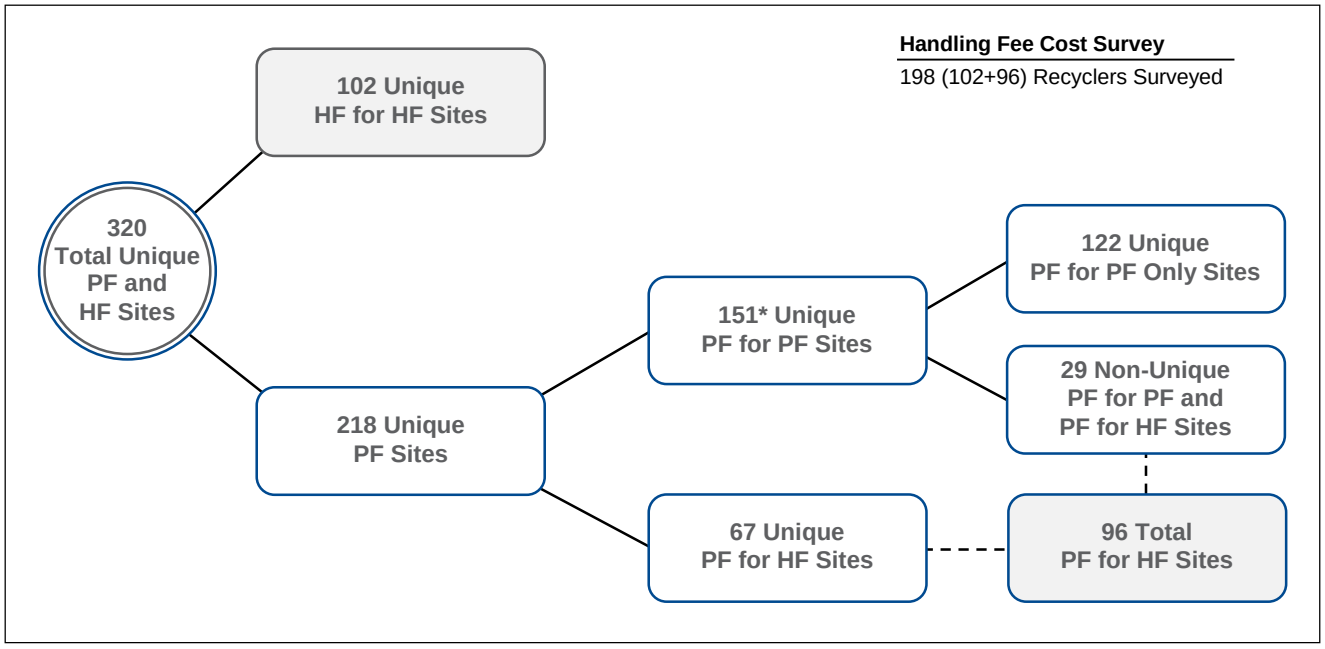
Below, we summarize eight of the major tasks that the Crowe team conducted to complete this handling fee cost survey. The processing fee cost survey and handling fee cost survey were conducted in parallel. Several of these tasks were the same for both surveys: for example, updating the cost model, training, and quality control. The cost survey procedures, field methodology, and quality control steps were identical for both processing fee recyclers and handling fee recyclers.

1. **Developed and documented a sample survey design framework, and selected recycling centers for the cost survey.** The requirement to calculate the statewide, weighted-average, cost to recycle beverage containers for both processing fee and handling fee recyclers necessitated evaluating and defining survey sample strata based on the number of containers. Consistent with the 2006, 2008, and 2010 handling fee cost surveys, Crowe utilized a strata definition that resulted in approximately the same total number of containers recycled within each strata population of handling fee recycling centers (just over 1.1 billion containers in each of the three survey strata). We selected a set of parallel strata definitions for processing fee recyclers, also resulting in approximately the same total number of containers recycled within each stratum's population of processing fee recycling centers (approximately 2.4 billion containers in each of the three survey strata). Following the sample design

and analyses, Crowe identified and selected a stratified random sample of 96 processing fee recycling centers, and a stratified random sample of 102 handling fee recycling centers, to participate in the handling fee cost survey.

2. **Monitored site completion characteristics to sample design for both handling fee recyclers and processing fee recyclers.** Each of the 96 processing fee surveys, and 102 handling fee surveys, were utilized to calculate recycler costs for the handling fee cost survey. **Figure ES-2,** below, illustrates the total number of processing fee and handling fee recyclers surveyed for both the processing fee and handling fee cost surveys, and the number of recyclers in the handling fee survey.
3. **Updated and calibrated the Labor Allocation Cost Survey Model.** The cost survey model is a 14-worksheet, Microsoft Excel-based computer model Crowe used to allocate recycling center costs to beverage container material types based on labor allocations. Crowe updated the cost model to reflect 2012 container per pound and CRV payment information, as well as other required procedural changes to the cost survey. In addition, we calibrated the Indirect Cost Allocation Sub-Models for Aluminum/Bi-Metal and All-Plastics with 2012 survey information. These sub-models, now incorporated into the Labor Allocation Cost Survey Model, ensured proper allocation of costs and labor to plastic resins HDPE #2, PVC #3, LDPE #4, PP #5, PS #6, Other #7; and bi-metal (collectively referred to as the minority materials). These allocations were necessary in order to determine costs per container for all CRV material types.

Figure ES-2
Processing Fee and Handling Fee Cost Survey Sample (2012)



* 29 PF sites within the 151 also were within the handling fee cost survey PF for HF sites, for a total 96 (67+29) PF sites used for the cost per container calculation.

4. **Updated the Cost Survey Training Manual.** The Training Manual (approximately 700 pages of reference material) consisted of 16 modules, each with detailed descriptions of cost survey background information, procedures, practice exercises, and case studies. We updated the Training Manual to reflect our practical experience in conducting the 2010 cost survey, as well as procedural changes that have occurred since the Training Manual was updated at the beginning of the 2002 cost survey.
5. **Conducted:** (1) a 64-hour training session for 10 new members of the cost survey team, and (2) a 24-hour refresher training session for five highly experienced returning members of the cost survey team. The training included lectures, background reading materials, sample exercises, practical problem-solving, and a final exam. CalRecycle staff also participated in the training sessions.
6. **Scheduled, conducted, and completed 96 processing fee recycler site visits and 102 handling fee recycler site visits.** The site visits occurred during the nine months, between April and December 2013, using the statistical sample frame developed by Crowe. Throughout the scheduling and site visits, the Crowe team built on the working relationships established in 2011 with the program's recyclers. These on-site working relationships were important to the success of this cost survey, and should carry over into future cost surveys. All of the cost surveys were conducted by a team of one or two auditors, including either accountants and/or recycling experts. It typically took between one to four hours to complete each on-site survey. In addition to the on-site time, usually up to eight hours of additional time was required after the site visits to analyze data, and to follow-up with each recycler to obtain complete financial and labor information.
7. **Developed and implemented an intensive quality control procedure.** The quality control procedure included 13 hours and five different levels of review (site team review, independent manager review, CPA partner review, business analyst review, and project director review) for each site file. This review took place before the site files were released for data processing. These quality assurance steps ensured that each site file was complete and accurate, and that all results from the labor allocation model and the indirect cost allocation sub-models were accurate. In total, more than 30 hours were usually spent for each completed processing fee site, and more than 25 hours were usually spent for each completed handling fee site, for the site team and quality control efforts.
8. **Determined the final cost per container for processing fee and handling fee recyclers.** Using an automated process, Crowe extracted results from each of the 198 (96 plus 102) completed cost models. Crowe developed two Microsoft Excel workbooks, one for handling fee recyclers, and one for processing fee recyclers, to calculate costs per container. We based the calculations for the processing fee recycler and handling fee recycler cost per container on a weighted-average by stratum approach. Using defined and documented statistical procedures, Crowe calculated error rates at a 90 percent confidence interval for these two cost per container calculations.

CalRecycle

Section 1

Handling Fee Cost Survey Methodologies

1. Handling Fee Cost Survey Methodologies

This section describes the cost survey methodologies, from establishing the survey sample frame, to the quality control procedures, and all the supporting tasks in between. Crowe Horwath LLP (Crowe) conducted several of these tasks jointly for the processing fee survey and the handling fee survey. There are nine key tasks described in this section:

A. Survey Design
B. Survey Scheduling, Logistics, and Confidentiality
C. Training Manual Updates
D. Surveyor Training
E. Cost Model Updates
F. Calibration of the Indirect Cost Allocation Sub-Models
G. Site and Survey Tracking
H. Cost Survey Procedures
I. Quality Control and Confidentiality Procedures.

A. Survey Design

This 2012 survey was the fourth time that CalRecycle conducted a handling fee survey to determine the cost per container of recycling beverage containers. Crowe developed the survey design for the first three handling fee cost surveys, and for the five most recent processing fee cost surveys. We utilized the same handling fee cost survey design methodology that we developed for the previous three handling fee cost surveys.

The purpose of the survey design was to identify the specific recycling centers surveyed during 2013, to estimate California statewide, weighted-average, 2012 certified recycler center cost per container to recycle for handling fee recyclers, and processing fee recyclers. Recycler center costs were surveyed in 2013, using recycler center calendar year 2012 financial statements. Recycler center costs measured by the cost survey will be used for the handling fee payment calculation, effective July 1, 2014.

For this current 2012 cost survey, a significant change was made in adjusting the population and the sample for recycling centers (RCs) being investigated by CalRecycle. For this current cost survey, CalRecycle provided the list of all sites being investigated prior to selecting the sample size. This year, Crowe removed all sites being investigated from the full population. Currently, CalRecycle has increased its enforcement activities in response to the increase in illegal redemption activity. CalRecycle was investigating 343 certified recycling centers (269 processing fee and 74 handling fee). For this cost survey, we removed these 343 recycling centers (RCs) from the population data prior to selecting the sample.

The population of processing fee recycling centers eligible for the handling fee cost survey was the same as the population of processing fee recycling centers eligible for the processing fee cost survey, defined as all recycling centers: (1) not receiving handling fees between January 2012 and December 2012, (2) certified and operational on or before March 1, 2012, (3) reported redemption value between January 2012 and December 2012, and (4) not subsidized by the Department of Rehabilitation. There were 763 recycling centers in this total processing fee recycling center reduced population.

The population of handling fee recycling centers eligible for the handling fee cost survey was defined as all recyclers: (1) receiving at least one handling fee payment for any of the months between January 2012 and December 2012, (2) certified operational on or before March 1, 2012, (3) reported redemption value between January 2012 and December 2012, and (4) not subsidized by the Department of Rehabilitation. There were 911 recycling centers in this total handling fee recycling center reduced population.

The processing fee recycler cost per ton calculations for aluminum, glass, PET #1, and HDPE #2, were based on a stratified random sample design. The three processing fee cost survey strata were defined by tons of glass redeemed. Glass ton strata definitions for processing fee recyclers have provided a proven, valid mechanism to minimize the sample size necessary, but still obtain a statistically valid cost per ton result for the four major material types: aluminum, glass, PET #1, and HDPE #2.

The requirement to calculate statewide, weighted-average costs to recycle beverage containers for processing fee, and handing fee, recyclers necessitated evaluating and defining new strata based on number of containers. Glass tonnage strata were not relevant for the handling fee cost survey. Crowe defined container strata based on the number of containers recycled at each site.

The strata definition for handling fee sites that resulted in an efficient sample size is shown in **Table 1-1,** on the next page. These handling fee container strata definitions resulted in approximately the same total number of containers recycled within each strata population of handling fee recycling centers (just over 1.1 billion containers). We conducted a similar analysis of strata definitions for processing fee sites, and identified strata definitions for processing fee sites that resulted in an efficient sample size, as shown in **Table 1-2,** on the next page. The processing fee recycler container strata definitions also resulted in approximately the same total number of containers recycled within each stratum's population of processing fee recycling centers (just under 2.4 billion containers).

To measure calendar year 2012 costs, the survey design consisted of two components:

- A statistically defensible, stratified random sample of 102 sites, drawn from the 911 qualifying handling fee recycling centers. Three strata were defined by the total annual containers handled by a site. This stratified random sample was used to measure the costs of recycling California Redemption Value (CRV) containers for handling fee recycling centers
- A statistically defensible, stratified random sample of 96 sites, drawn from the 763 qualifying processing fee recycling centers. Three strata were defined by the total annual containers handled by a site. This stratified random sample was used to measure the costs of recycling CRV containers for processing fee recycling centers.

Crowe treated the above two survey components equivalently, in terms of scheduling, site visits, and quality control. It was only in the final calculations that Crowe made a distinction between the two groups.

Because of these parallel strata definitions for handling fee and processing fee recyclers, we were able to directly compare cost per container results for the two populations. Furthermore, as a result of this survey design, the cost survey conducted for 2012 costs per container treated the two recycler populations with equal statistical rigor.

CalRecycle regulations require that the cost per container be estimated at an 85 percent confidence interval, and CalRecycle policy further specifies a 10 percent maximum error rate. Similar to the processing fee cost survey, the sampling plan (for the two stratified random samples) was based on a more accurate and statistically conventional and accepted, 90 percent confidence interval. However, rather than use a more standard 10 percent error rate in determining sample size, Crowe utilized a 6 percent error rate. This lower 6 percent error rate resulted in a more conservative sample size, necessary to maintain the overall accuracy of the survey.

Sample Design

Table 1-3, on the next page, provides a summary of the completed handling fee recycler survey sites. Crowe scheduled, conducted, and completed 102 handling fee recycler site visits and cost analyses for the handling fee cost survey.

Table 1-4, on the next page, provides a summary of the completed processing fee recycler survey sites. Crowe scheduled, conducted, and completed 96 processing fee recycler site visits and cost analyses for

the handling fee cost survey. A total of 29 sites in Table 1-4 had multiple designations. Crowe surveyed these 29 sites for both the handling fee and processing fee cost surveys.

Table 1-1
Handling Fee Recycler
Container Stratum Definitions
(2012)
Handling Fee Cost Survey

Stratum	2012 Number of Containers Recycled
1	Greater than, or equal to, 6.6 million containers
2	Greater than, or equal to, 3.51 million containers, up to less than 6.6 million containers
3	Less than 3.51 million containers

Table 1-2
Processing Fee Recycler
Container Stratum Definitions
(2012)
Handling Fee Cost Survey

Stratum	2012 Number of Containers Recycled
1	Greater than, or equal to, 21.3 million containers
2	Greater than, or equal to, 10.8 million containers, up to less than 21.3 million containers
3	Less than 10.8 million containers

Table 1-3
Handling Fee (HF) Recycler Site Visits
(2012)
Handling Fee Cost Survey

Handling Fee Recycler Site Category	Number of HF Site Visits
HF Container Stratum 1	24
HF Container Stratum 2	23
HF Container Stratum 3	55
Total HF Completed Sites	102

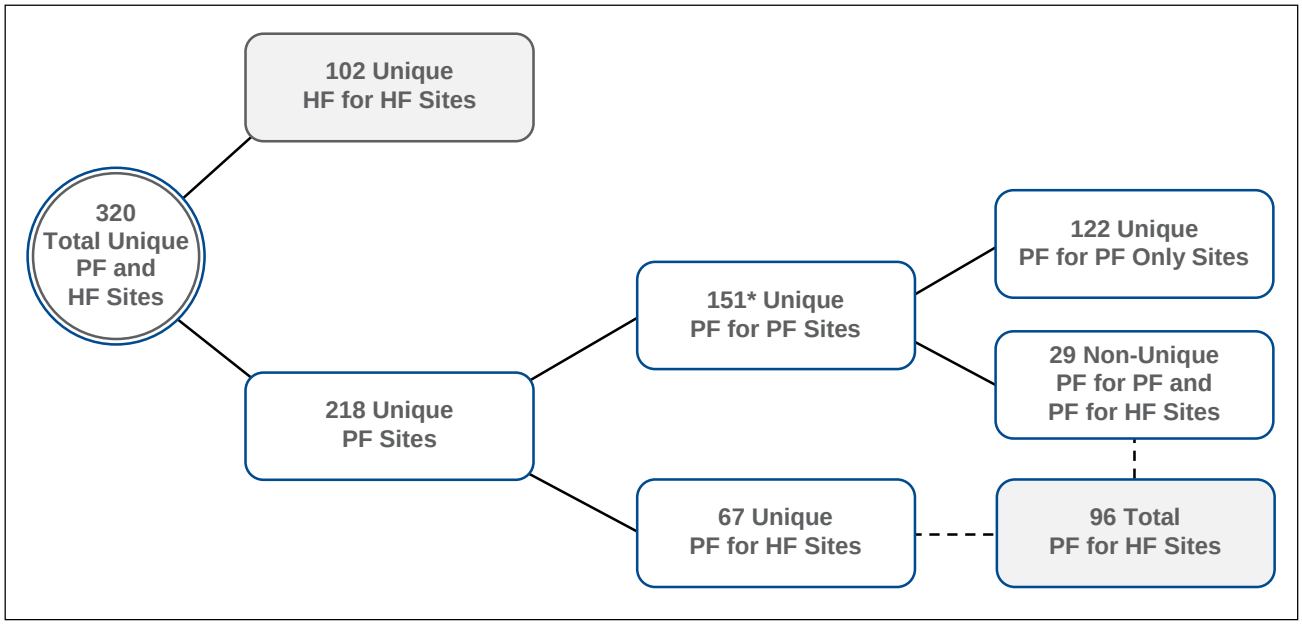
Table 1-4
Processing Fee (PF) Recycler Site Visits
(2012)
Handling Fee Cost Survey

Processing Fee Recycler Site Category	Total Number of PF Site Visits for HF Survey	Number Visited for HF Survey Only[a]	Number Visited for Both PF and HF Surveys[b]
PF Container Stratum 1	23	10	13
PF Container Stratum 2	25	18	7
PF Container Stratum 3	48	39	9
Total PF completed sites	96	67	29

[a] These 67 of 96 sites were selected only for the cost per container calculation for processing fee sites for the handling fee cost survey.

[b] These 29 of 96 sites were selected for the cost per container calculation for the handling fee cost survey, and for the cost per ton calculation for the processing fee cost survey.

Figure 1-1
Cost Survey Sample
(2012)
Processing Fee and Handling Fee Cost Survey



* 29 PF sites within the 151 also were within the handling fee cost survey PF for HF sites, for a total 96 (67+29) PF sites used for the cost per container calculation.

Table 1-5
Error Rates, Population Sizes, Sample Sizes and Method by Recycler Type
(2012)
Handling Fee Cost Survey

Recycler Type	Error Rate (90% CI)	Population Size	Sample Size	Sample Method
1. Handling Fee Recyclers	4.37%	911	102	Container Stratified Random Sample
2. Processing Fee Recyclers	6.30%	763	96	Container Stratified Random Sample

Together, the processing fee and handling fee cost surveys performed in 2013 represented one of the largest cost survey efforts undertaken by the CalRecycle, to-date. In total, the Crowe team completed 320 recycler cost surveys, comprised of 218 surveys of processing fee recyclers, and 102 surveys of handling fee recyclers. **Figure 1-1,** above, provides a schematic of the processing fee and handling fee cost survey unique sites.

Table 1-5, above, provides a comparison of the error rates, population size, sample size, and sample method for the two recycler populations in the handling fee cost survey. With error rates of 4.37 percent

(HF) and 6.3 percent (PF), this handling fee cost survey exceeded the conventional statistical accuracy of 10 percent at the 90 percent confidence level for both handling fee and processing fee recyclers.

B. Survey Scheduling, Logistics, and Confidentiality

A significant component of the cost survey involved scheduling site visits and communicating with recyclers chosen from the sample frame. Two project staff were employed during the start-up and survey months (April through December 2014) to coordinate scheduling and communicate with recyclers.

Because conducting a cost survey fundamentally entails the collection of proprietary financial information, sensitivity to stakeholder relations is highly important. Without willing and active cooperation from the selected recycling center operators, determining the real costs of beverage container recycling would be exceptionally difficult, and the results would be hard to support.

Our approach was to communicate with the site operators and managers from the start of the process to help them understand what the cost survey entailed, to clarify what information we were seeking to obtain, and, perhaps most importantly, to correct misunderstandings about the purpose of the cost survey.

The first stage of recycler communication was a letter, on CalRecycle letterhead, informing the recycler that they were selected to participate in the handling fee cost survey. The letter also identified expectations of the recycler, and introduced Crowe as the CalRecycle contractor. Introduction letters were sent to selected recyclers starting in May 2013.

In the second stage of communication, Crowe's scheduling coordinators made telephone contact with recyclers. We usually scheduled site visit appointments for first thing in the morning, or first thing in the afternoon. The survey team also contacted the recycler directly, one or two days before the site visit, for final visit confirmation. Site visits were generally conducted by a team of two surveyors, including accountants and/or recycling experts. Survey teams made their own travel arrangements.

There were two handling fee recycler operators that owned a significant number of sites selected for the survey. For these two organizations, the scheduling coordinators set up an initial meeting between a Crowe business analyst and corporate officers, prior to scheduling individual site visits. We obtained most of the required financial and labor information for the organizations at this initial meeting.

The coordinators conducted many behind-the-scenes tasks to determine overall success of the project. For example, to reduce travel expenses, the coordinators utilized specialized mapping software to schedule consecutive site visits first within regions, and then within nearby locations. In addition, the coordinators were tasked to optimize site visit efficiency, matching: (1) the varying schedules of more than fifteen site survey team personnel, (2) diverse geographic locations, and (3) availability of the recycling centers. During any given week, up to three different survey teams were in the field. In most cases, one site visit, with some telephone follow-up, was sufficient to obtain all the information needed to complete the survey of each site.

The coordinators maintained a secure file transfer protocol (SFTP) site within Crowe's domain, accessible by password only, to survey team members, as a single point of distribution for confidential cost model templates, scheduling information, and cost model forms. To maintain confidentiality of recyclers' proprietary information, every Crowe employee and subcontractor employee who worked on the handling fee cost survey signed individual Confidentiality Agreements warranting that they would not disclose any information made available by each certified recycler. Also, each company contractor – Crowe Horwath LLP (Prime Contractor); Richardson & Company (Subcontractor); Geiss Consulting (Subcontractor); Encina Advisors, LLC (Subcontractor); and Leon E. Tuttle, CPA; and Dennis Nelson, CPA (Disabled Veteran Business Enterprise Subcontractors) – signed company Confidentiality Agreements.

C. Training Manual Updates

The first Processing Fee Cost Survey Training Participant Manual was prepared by NewPoint Group in 1995 to support the processing fee cost survey training provided to Division of Recycling (DOR) staff at that time. This manual contained hundreds of example case studies, problem sets, quizzes, sample financial documents, handouts, reading assignments, and procedures to develop skills needed to conduct successful processing fee cost surveys.

Because the training manual was originally prepared in 1995, it required extensive revisions and adjustments, which NewPoint Group made prior to the 2002 cost survey. For the current processing fee and handling fee cost surveys, Crowe reviewed the training modules, and when appropriate, revised work assignments needed to support the in-classroom and self-study training modules.

For the first handling fee cost survey in 2006, NewPoint Group updated relevant aspects of the training manual to include background information on convenience zones and handling fees, and specific costing information for handling fee recyclers, such as non-allowable incentive payments to supermarkets. Because the cost survey procedures were identical for the processing fee and handling fee surveys, these revisions to the training manual were relatively minor.

The updated training manual consisted of three volumes:

- Training Manual, Volume I (the primary training manual, approximately 700 pages in length)
- Supplemental Materials, Volume II (background reading and support materials)
- Field Manual, Volume III (a summary version of the site visit procedures).

D. Surveyor Training

Successfully completing the processing fee and handling fee cost survey site visits required knowledge of recycling, recycling practices, the beverage container recycling program, the specific procedures of site visits, auditing, and financial cost-accounting. The Crowe-trained surveyor team consisted primarily of accountants and recycling experts.

Five of the fifteen individuals who conducted site visits for this survey had previous experience in the 2002, 2004, 2006, 2008, and/or 2010 cost surveys, had completed the full 64-hour training session, and in some cases also completed a 24-hour refresher training in prior years. These surveyors already had extensive experience in auditing and financial accounting procedures, as well as practical site-visit and recycling program experience. These five returning team members still completed another 24-hour refresher course in 2013. The ten new survey team members completed the full 64-hour training program in 2013.

Classroom training consisted of 60 hours of in-class lectures, reading materials, study exercises, and problem solving. In 2013, for the third time, we included an additional four hours of field training, as part of the 64 total hours of training. The classroom training was held at Crowe's Sacramento office, and all training was conducted over a two-week period, during the last half of April 2013.

The field training consisted of a four-hour field trip to a Sacramento-area recycling center to tour the site and conduct the site survey. The field trip was held on the seventh day of the eight-day training, and consisted of the actual site-visit component of a cost survey at a recycling center that had been randomly selected for the cost survey. An experienced Crowe team member conducted the cost survey, with the training class observing, and asking questions. This field training provided new team members with valuable on-site experience prior to their first site visits, and provided a refresher for those that had previously conducted site visits.

E. Cost Model Updates

The labor allocation cost model (cost model) is an Excel workbook consisting of 14 worksheets. The model was first developed by NewPoint Group to improve the methodology of the 1995 cost surveys. Since that time, it has been updated and revised to accommodate legislative and regulatory changes, as well as upgrades of Excel. In 2000, NewPoint Group and the DOR conducted a significant revision to add plastic resins #2 to #7 to the model, and to upgrade to Excel 1997, which replaced old Excel macros with Visual Basic programming.

The current version of the cost model represents several legacy generations (and layers) of modifications and updates, including a significant number of improvements that were made immediately following the 2002, 2004, 2006, 2008, and 2010 cost surveys. To update the model for the 2006 handing fee survey, we added a cost per container calculation to the Recycler Cost Summary worksheet. Prior to conducting the current cost survey, Crowe reviewed and updated the model to reflect 2012 container per pound and CRV payment information, as well as procedural changes to the cost survey. Crowe used the same cost model for both the handling fee and processing fee cost surveys.

F. Calibration of the Indirect Cost Allocation Sub-Models

The cost model includes two indirect cost allocation sub-models, to calculate the costs per ton of bi-metal, and plastic resins #2 to #7. The sub-models still are used, even though all minority material costs per ton were no longer calculated for the processing fee cost survey. For this 2012 cost survey, we applied this same indirect cost allocation sub-model procedure to determine costs per ton for the minority material types that was developed in 2002, and used again in 2004, 2006 2008, and 2010. While the sub-models were not used specifically for the cost per container calculations, the sub-models are an integral part of the cost model, and thus are integral to the cost surveys.

The purpose of the two sub-models, the Indirect Cost Allocation Sub-Model for All Plastics, and the Indirect Cost Allocation Sub- Model for Aluminum/Bi-Metal, was to separate the individual majority and minority material costs from the larger indirect cost categories, all plastics and aluminum/bi-metal. Using operational and material handling factors, the sub-models provide a consistent, site-specific, and sub-material specific approach, for determining the costs per ton for both the high-tons majority materials, and low-tons minority materials.

Four operational/material handling factors (weight, number of containers, volume (size) of containers, and commingled rate), along with a weighting allocation across these factors, formed the basis of the indirect cost allocation sub-models for the two majority, and seven minority, materials (glass does not require a sub-model). The sub-models were integrated into the Labor Allocation Cost Model for each site.

G. Site and Survey Tracking

For this cost survey, Crowe developed and utilized a reporting system, which included a row of descriptive information on each of the 320 surveyed processing fee and handling fee recycling sites. Information in the reporting system included: RC and processor (PR) numbers; recycler name; county; recycler type; recycler sample(s) and stratum; site survey team members; and entry dates and initials for each of nine stages of the survey process, from mailing the initial letter, to scheduling, to final review approval.

At any point in time during the surveys, the Crowe business analyst could quickly identify how many sites were in each of nine status completion states, and where each individual site was in the site completion process. Crowe also utilized the site status reporting system to help prepare monthly progress reports for CalRecycle.

H. Cost Survey Procedures

There were three phases of an individual cost survey:

- Pre-site visit – model population, data review, and travel logistics
- On-site visit – site tour, cost survey, and labor interviews
- Post-site visit - data entry, analysis, and follow-up.

Pre-Site Visit

Before conducting the on-site cost survey, the survey team obtained all available information about that site. Crowe entered recycling tons for 2012 into the cost model Excel file for each site. The survey team evaluated the tons and containers recycled information to identify the approximate size and scope of the survey. Much of the pre-site visit time was spent on travel logistics and mapping.

On-Site Visit

For the two handling fee operators with a large number of sites in the sample, a Crowe business analyst met first at each company's operation headquarters to discuss financial and labor information, and then survey teams visited each individual site. The actual site visits for these sites typically were less than two hours, because Crowe had already obtained and discussed the financial and labor information at the initial headquarters meeting.

With the exception of the large handling fee operators, the primary data-gathering effort took place during the site visit. Each site visit typically lasted one to two hours, depending on the size and complexity of the site. Survey teams carefully followed procedures outlined in the Training Manual, Volume I. The survey team first toured the site with site management to view and inquire about the site's operations, such as materials handled, equipment, recycling procedures, and material shipping.

Another key task was reviewing the financial information with site management, or a financial officer, to identify and categorize allowable and non-allowable costs for calculating handling fees, direct and indirect costs, beverage container indirect (BCI) costs, and all materials indirect (AMI) costs.

The cost categories for the handling fee cost survey were identical to those used for the processing fee cost survey. However, there were operational differences between the two populations. For example, some handling fee recycling centers located in supermarket parking lots pay the supermarket specifically for the privilege of locating at that store. These "incentive" or "exclusivity" payments were paid in addition to rent, and were not allowable costs. Processing fee recyclers did not have this type of payment.

The next key task was conducting structured labor allocation interviews to determine allocation of each employee's time first to recycler, or other business, then to direct yard labor or all other labor, and finally by CRV material type or other non-CRV material type. The cost model used this labor allocation information to allocate indirect costs and wages.

Post-Site Visit

After the site visit, the survey team spent from four to ten hours, or more, further compiling the site data, entering information into the cost model, completing the Site Memorandum and site file, and reviewing the site file. In many cases, site managers did not have all the necessary information available at the site visit, and the survey team had to telephone to request additional information, or to ask specific questions about the data.

The survey team prepared the Site Memorandum using information gathered during the site tour. The Site Memorandum summarized important information about the site, including: (1) a description of operations, (2) a description of CRV materials handled, (3) the source of financial information, (4) specific sources of payroll information, (5) direct costing, or other special cost considerations, (6) problems encountered and how these problems were solved, (7) final review and comments, and (8) a contact person's name, title, telephone/fax numbers, and email address, if available.

Following the site visit, the team entered the labor information for each recycler employee, as well as the cost summary and direct cost information, into the cost model. After Crowe entered the data into the cost model, the model calculated recycling costs per CRV container. Finally, the survey team compiled and checked all work papers, and conducted a reasonableness check of survey results, before passing the site file on to a manager for the first of several independent office review steps.

I. Quality Control and Confidentiality Procedures

Data quality control (QC) was a primary focus of the cost survey project. Quality control procedures included five separate levels of review and totaled on-average 13 hours per site. These data QC procedures were essential to determine that the cost survey results were fair, equitable, accurate, reasonable, justifiable, and defensible.

This extensive quality control process, with five different individuals or teams, determined that each site file was complete and accurate. Files that did not meet all the quality control criteria were returned to the original survey team for corrections, if appropriate. Crowe approved site file data for the final cost per container calculations described in Section 2, after this extensive series of quality control reviews was complete.

Confidentiality was important for the cost survey. The data from each recycling site were not to be disclosed, as release of the data could potentially be compromising to a recycling business. As a result, Crowe developed formal policies regarding confidentiality. Each project team member signed an Employee Confidentiality statement, and in addition, each project team firm signed a similar statement. Records from each site were maintained securely at the Crowe offices after they were completed, and Crowe shredded financial printouts and worksheet drafts with site-specific information. Crowe delivered the final site files to CalRecycle for their secure record retention. Crowe protected computers against unauthorized access through use of security software that requires a password to use our laptops. Crowe stored all electronic files related to site visits on a secure file transfer protocol (SFTP) site within Crowe's domain, accessible by password only, to survey team members.

CalRecycle

Section 2

Handling Fee Cost Calculations and Results

2. Handling Fee Cost Calculations and Results

This section describes the calculations used, and the final results for, the statewide, weighted-average cost per container to recycle for processing fee recyclers, and handling fee recyclers. This section is organized as follows:

A. Cost Calculations
B. Cost Results
C. Comparison of Cost Results.

A. Cost Calculations

This handling fee cost survey was the fourth time that CalRecycle calculated cost per container at the statewide level. This section discusses various methodological issues related to this calculation.

The statewide statistical methodology (stratified weighted-average cost, simple weighted-average cost, or population weighted-average cost) used for either cost per ton calculations, or cost per container calculations, were pre-determined by sample design.[3] We utilized a stratified random sample for the handling fee cost survey.

For our stratified random samples, we used a weighted-average by strata calculation to determine cost per container. This weighted-average by strata calculation is similar to the approach for aluminum, glass, PET #1, and HDPE #2 cost per ton for the processing fee cost survey. **Figure 2-1,** on the next page, illustrates the weighted-average by strata calculation approach for calculating cost per container.

The handling fee cost survey consisted of two stratified random samples, one for handling fee recyclers, and one for processing fee recyclers. Within each population, recyclers were grouped into one of three strata, based on the annual number of containers recycled. While the specific definitions for handling fee container strata and processing fee container strata were different, the overall structures of the two sets of strata were similar. That is, both the handling fee and processing fee container strata were constructed so that the recyclers within each stratum handled approximately one-third of the total number of population containers recycled. This was important, because it allowed us to directly compare results of the two cost per container calculations.

The first step in calculating cost per container was to aggregate the individual material cost results from the completed labor allocation cost model for each site. For each recycling site, we calculated total California Redemption Value (CRV) costs by summing CRV costs for each of the ten material types, as determined by the labor allocation cost model and sub-models.

Next, we converted tons of each CRV material to number of containers. The number of CRV containers for a given material type was equal to: tons redeemed in 2012 × 2,000 × CPP, where CPP was the 2012 statewide average containers per pound for each material type, as determined by CalRecycle. We determined the total CRV containers by calculating the number of CRV containers for each material type, and summing across all ten material types. For example, for a recycler with 100 tons of aluminum redeemed, the number of aluminum containers was equal to:

(100 tons) × (2,000 pounds/ton) × (28.77 containers/pound) = 5,754,000 containers.

[3] The Beverage Container Recycling Act specifies that cost per ton and cost per container calculations be based on a statewide weighted-average. The Act eliminated the calculation of a simple average (taking the average of each site, and dividing by the total number of sites).

Figure 2-1
Cost per Container Calculation
(2012)
Handling Fee Cost Survey

$$\frac{\text{Container Stratum 1 Sample Costs}}{\text{Container Stratum 1 Sample Containers}} \times \text{Container Stratum 1 Population Containers} = \text{Container Stratum 1 Total Population Costs}$$

$$+$$

$$\frac{\text{Container Stratum 2 Sample Costs}}{\text{Container Stratum 2 Sample Containers}} \times \text{Container Stratum 2 Population Containers} = \text{Container Stratum 2 Total Population Costs}$$

$$+$$

$$\frac{\text{Container Stratum 3 Sample Costs}}{\text{Container Stratum 3 Sample Containers}} \times \text{Container Stratum 3 Population Containers} = \text{Container Stratum 3 Total Population Costs}$$

$$\frac{}{\frac{\text{Total Population Costs}}{\text{Total Population Containers}}}$$

$$= \text{Statewide Stratified Weighted-Average Cost Per Container}$$

Once we had determined individual site CRV costs and CRV containers, we were able to determine statewide weighted-average costs per container. For the weighted-average by stratum calculation for cost per container, we first determined an average sample cost per container for each stratum by dividing total CRV costs for the stratum by total CRV containers in the stratum. We then multiplied that stratum average cost per container by total containers in the stratum population. We then summed total CRV costs for the three strata, and divided by total containers in the population. This calculation is illustrated in Figure 2-1.

B. Cost Results

The statewide, weighted-average, recycler cost per container for handling fee recyclers and processing fee recyclers are presented in **Figure 2-2,** on the next page. The statewide, weighted-average, cost to recycle for handling fee recyclers in 2012 was 2.440 cents per container, 74 percent higher than the statewide, weighted-average, cost to recycle for processing fee recyclers in 2012, at 1.405 cents per container.

Table 2-1, on the next page, includes the new handling fee payment calculation, 1.035 cents per recycled container, equal to the difference between the handling fee recycler statewide, weighted-average, cost per container to recycle, and the processing fee recycler statewide, weighted-average, cost per container to recycle, as specified in Section 14585 (f)(3). Under existing law, CalRecycle is scheduled to implement this new handling fee payment starting July 1, 2014.

The sample sizes used to determine the costs per container were estimated to achieve a 90 percent confidence interval. This standard was higher than the statistical requirements in regulations for handling fee survey cost per container calculations, which specify an 85 percent confidence interval. The 2012 cost per container results for both handling fee recyclers and processing fee recyclers exceeded this target, with low error rates at the 90 percent confidence level of 4.37 percent, and 6.30 percent, respectively.

Figure 2-2
Handling Fee and Processing Fee Recycler Cost per Container
(2012)
Handling Fee Cost Survey

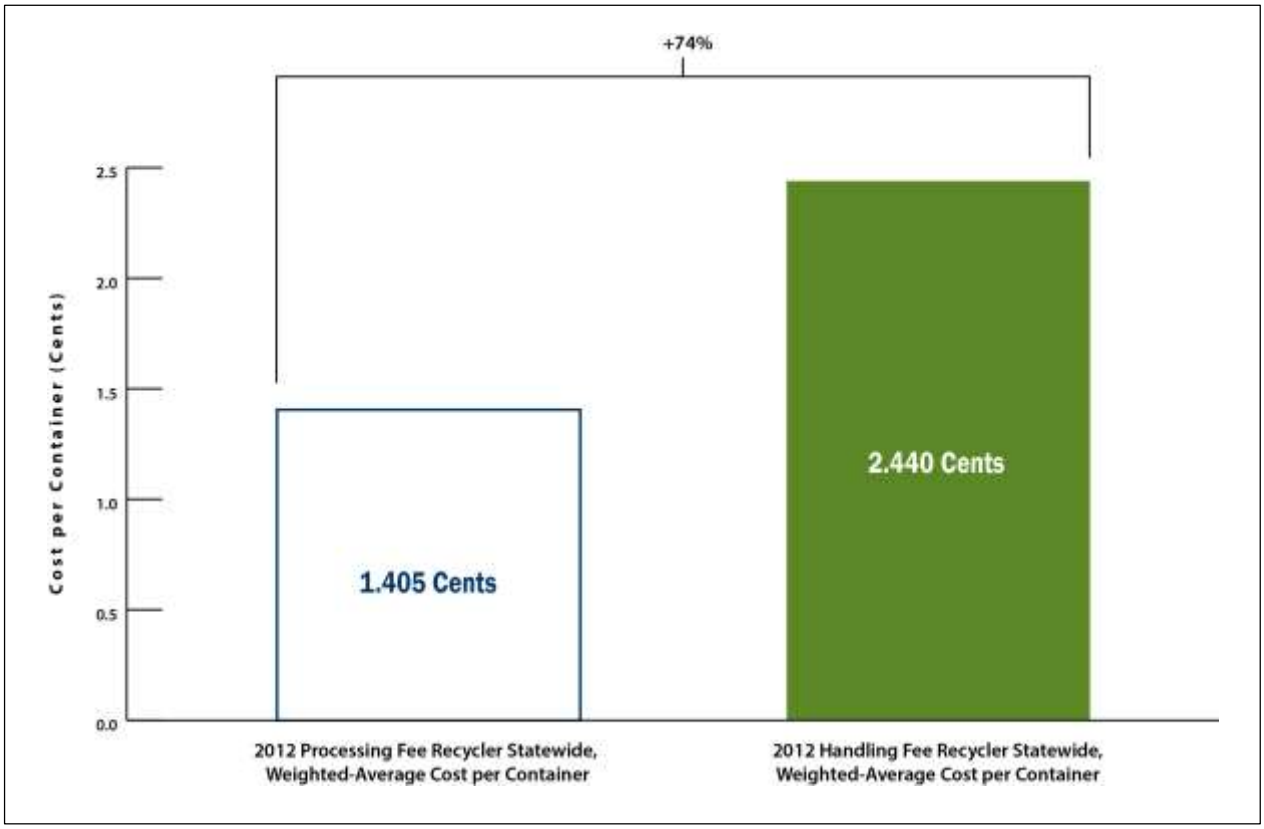


Table 2-1
Statewide Recycler Costs per Container
(2012)
Handling Fee Cost Survey

Recycler Type	Statewide, Weighted Average, Cost per Container	Percentage Change (PF to HF Cost per Container)	Error Rate at 90 % Confidence Interval
1. Handling Fee Recycler	2.440 Cents	+74%	4.37%
2. Processing Fee Recycler	1.405 Cents		6.30%
3. Handling Fee Recycler Cost per Container minus Processing Fee Recycler Cost per Container	1.035 Cents		

Table 2-2
Handling Fee and Processing Fee Recyclers
Number of Containers Recycled, Reduced Population Sizes, and Sample Sizes
(2012)
Handling Fee Cost Survey

1. Handling Fee Recyclers	3.40 billion	911	102
2. Processing Fee Recyclers	7.14 billion	763	96

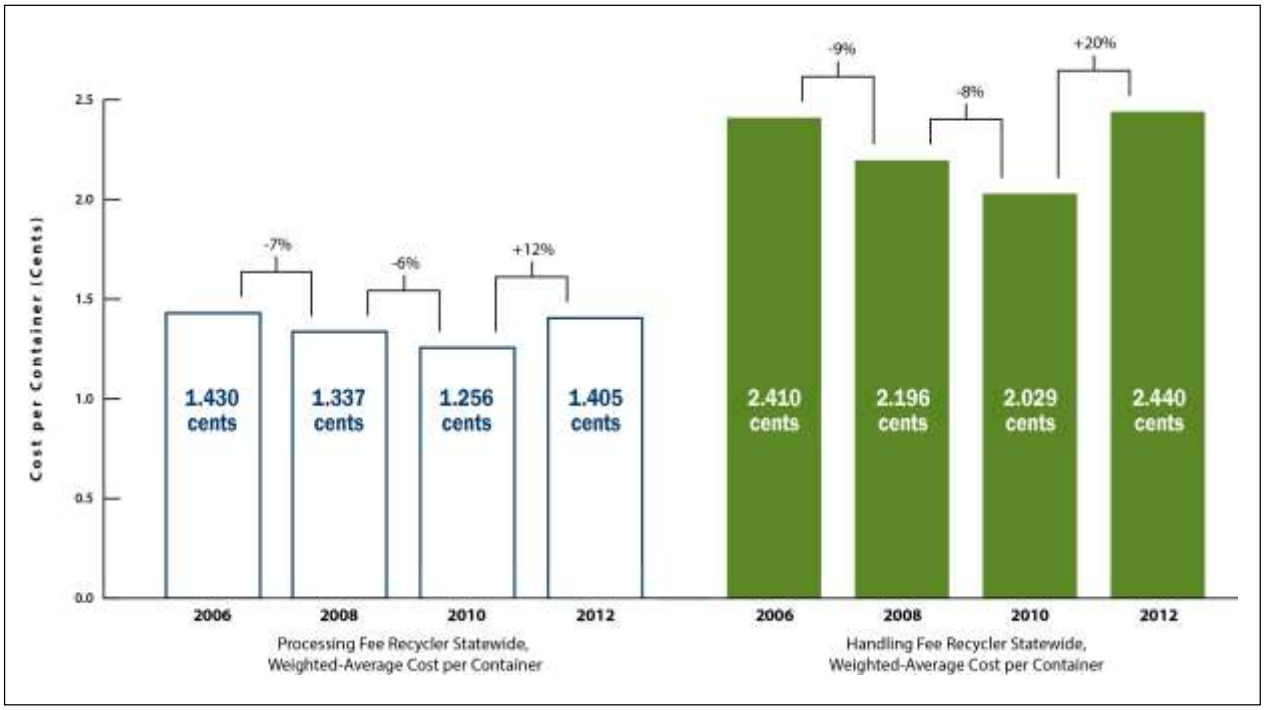
Table 2-3
Strata and Population Costs and Volumes
(2012)
Handling Fee Cost Survey

Container Stratum	Sample CRV Costs	Sample CRV Containers	Cost per Container	Population CRV Costs	Population CRV Containers
Handling Fee Recyclers					
1	$3,632,225.49	222,698,874	$0.016310030782	$18,445,404.31	1,130,923,942
2	2,171,998.88	100,219,463	0.021672425844	24,644,166.78	1,137,120,826
3	3,654,619.57	103,719,522	0.035235599813	39,856,536.93	1,131,143,989
Total				$82,946,108.02	3,399,188,757
Handling Fee Recycler Statewide, Weighted-Average Cost per Container					**$0.02440**
Processing Fee Recyclers					
1	$8,818,748.89	663,250,916	$0.013296248340	$31,751,655.61	2,388,016,138
2	5,169,460.08	386,071,349	0.013389908608	31,922,367.10	2,384,061,612
3	4,072,841.67	262,931,300	0.015490136267	36,622,259.77	2,364,230,962
Total				$100,296,282.48	7,136,308,712
Processing Fee Recycler Statewide, Weighted-Average Cost per Container					**$0.01405**

Table 2-2, above, compares total number of containers recycled, reduced population size, and sample size for handling fee and processing fee recyclers. **Table 2-3,** following Table 2-2, illustrates the cost per container calculations for the two populations of recyclers.

As of now, the new handling fee payment, on July 1, 2014, will be paid on all eligible containers recycled by supermarket sites, nonprofit convenience zone recyclers, and rural region recyclers. The new, calculated, per container handling fee payment of 1.035 cents is greater than the handling fee payment determined in the 2010 handling fee cost survey, of 0.773 cents per container.

Figure 2-3
Comparison of Processing Fee Recycler and Handling Fee Recycler
Cost per Container
(2006, 2008, 2010, and 2012)
Handling Fee Cost Survey



C. Comparison of Cost Results

Figure 2-3, above, compares the statewide, weighted-average cost per container for processing fee and handling fee recyclers from the 2006, 2008, 2010, and 2012 handling fee cost surveys. As compared to 2010, both handling fee recycler cost per container, and processing fee recycler cost per container, increased. The handling fee recycler increase in cost per container between 2010 and 2012 of 20 percent is significantly greater than prior year changes in cost per container. The number of containers recycled by handling fee recyclers also decreased between 2010 and 2012, one reason for the higher cost per container. The processing fee recycler increase in cost per container between 2010 and 2012 of 12 percent reflects the processing fee cost survey result in which aluminum cost per ton increased 14 percent, glass cost per ton increased 3 percent, and PET #1 cost per ton increased 5 percent.

Between 2006 and 2008, the processing fee recycler cost per container decreased 7 percent, while the handling fee recycler cost per container decreased 9 percent. Between 2008 and 2010, the processing fee recycler cost per container decreased 6 percent, while the handling fee recycler cost per container decreased 8 percent. For both surveys, these decreases are consistent with the processing fee cost survey cost per ton results, in which costs per ton decreased for all material types, except aluminum between 2006 and 2008, and for aluminum (which makes up the largest number of containers), between 2008 and 2010.

Table 2-4
Costs per Container
(2012, 2010, 2008, and 2006)
Handling Fee Cost Survey

	Statewide, Weighted Average, Cost per Container				Percentage Change		
Recycler Type	2012	2010	2008	2006	2010 to 2012	2008 to 2010	2006 to 2008
1. Handling Fee Recycler	2.440 Cents	2.029 Cents	2.196 Cents	2.410 Cents	20%	-8%	-9%
2. Processing Fee Recycler	1.405 Cents	1.256 Cents	1.337 Cents	1.430 Cents	12%	-6%	-7%
3. Handling Fee Recycler Cost per Container minus Processing Fee Recycler Cost per Container	1.035 Cents	0.773 Cents	0.859 Cents	0.980 Cents	34%	-10%	-12%

Table 2-5
Statewide Recycler Error Rates
(2012, 2010, 2008, and 2006)

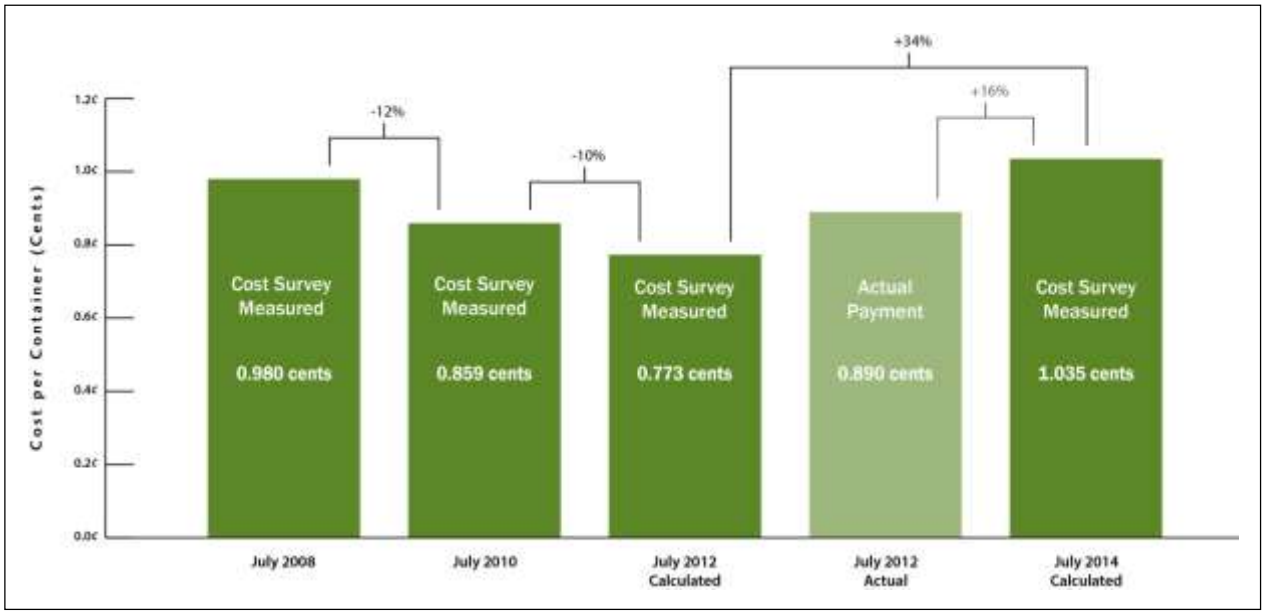
	Error Rate at 90% Confidence Interval			
Recycler Type	2012	2010	2008	2006
1. Handling Fee Recycler	4.37%	5.62%	5.17%	6.31%
2. Processing Fee Recycler	6.30%	5.79%	7.10%	6.16%

The decreases in cost per container between 2006 and 2008 were due in large part to increased volumes. The number of containers recycled by handling fee recyclers increased 28 percent between 2006 and 2008. Similarly, the number of containers recycled by processing fee recyclers increased 30 percent over the two-year period. The volume increases provided improved economies of scale, and thus led to lower per-container costs, for both types of recyclers. Between 2008 and 2010, the reduction in cost per container for handling fee recyclers similarly reflected a 14 percent increase in number of containers recycled. The smaller reduction in cost per container for processing fee recyclers reflected a smaller increase in containers recycled of 3 percent.

Table 2-4 and **Table 2-5,** above, provides a comparison of the results for the 2012, 2010, 2008 and 2006 handling fee cost surveys. The higher handling fee payment, as of July 1, 2014, will result in an increase of 34 percent in the per container handling fee payments, as compared to the calculated handling fee payment from the 2010 cost survey, and an increase of 16 percent over the actual implemented handling fee payment following the 2010 cost survey. The error rates for the 2012 handling fee cost survey were significantly lower (for handling fee recyclers), and somewhat higher (for processing fee recyclers), than the error rates for the 2010 handling fee cost survey. Both error rates, calculated at the 90 percent confidence level, were well below 10 percent.

Figure 2-4, on the next page, illustrates the four per container handling fees, as measured by the four cost surveys, and the actual implemented handling fee payment for July 2012. The measured handling fee per container dropped by twelve percent between July 2008 and July 2010, to 0.773 cents per container. CalRecycle made an administrative decision to maintain the prior $0.0089 cent per container handling fee for July 2012. The measured handling fee dropped ten percent between July 2010 and July 2012. The measured handling fee increased 34 percent between July 2012 and July 2014. The measured handling fee for July 2014 is 16 percent higher than the actual handling fee of July 2012.

Figure 2-4
Handling Fee Payment per Container
2008, 2010, 2012 (Actual and Calculated), and 2014
Handling Fee Cost Survey



Handling Fee Recycler Cost per Container Increase

The handling fee cost per container increased by 20 percent between 2010 and 2012. This is the first increase in handling fee (HF) cost per container since the 2006 handling fee cost survey. Below, we discuss factors that likely contributed to the higher HF cost per container, and resulting higher handling fee payment.

Cost per container is highly dependent on the number of containers recycled. **Table 2-6,** on the following page, provides a comparison of the HF recycler cost per container and the number of containers recycled by the HF recycler population for the four handling fee cost surveys (2012 shows the full population containers recycled). Table 2-6 shows that cost per container decreased between survey years when the number of containers recycled increased, and cost per container increased when containers recycled decreased.

The importance of number of containers recycled applies to the overall results, but starts at the individual recycling center level. In determining CRV costs at an individual recycling center, there is sometimes an opportunity to allocate costs between CRV and non-CRV (including other business) categories. However, the majority of handling fee recyclers only handle CRV material. For example, of the 102 HF recyclers surveyed, only six had labor allocations of more than 10 percent to non-CRV activities, and 33 recycling centers (RCs) had no labor allocated to non-CRV activities. Thus, the cost per HF container is primarily based on all of an RC's costs, divided by all of an RC's containers. To the extent that many RC costs are essentially fixed, the number of containers has a great influence on cost per container. By comparison, of 96 processing fee (PF) for HF sites surveyed, 60 had labor allocations of more than 10 percent to non-CRV activities, and only three had no time allocated to non-CRV activities. For PF recyclers, costs are distributed more often across CRV and non-CRV categories, so cost per container is less dependent on number of containers recycled.

Table 2-6
Cost per Container Results and Containers Recycled by the Survey Population
Handling Fee Recyclers (2006, 2008, 2010, and 2012)

Survey Year	Cost per Container (cents)	Percent Change in Cost per Container	Population Containers Recycled	Percent Change in Containers Recycled
2006	2.410		3,108,522,318	
2008	2.196	-9%	3,992,318,572	+28%
2010	2.029	-8%	4,562,408,591	+14%
2012	2.440	**+20%**	3,837,216,107[a]	**-16%**

[a] Containers recycled by the full population of 985 HF recyclers.

Figure 2-5, on the following page, provides a comparison of containers recycled by the PF and HF cost survey populations over the four handling fee cost surveys. Figure 2-5 also shows containers recycled by each of the 2012 reduced populations (RCs being investigated by CalRecycle are removed from the full population). Comparing the equivalent full population data, PF containers recycled has increased each year. HF containers recycled increased between 2006 and 2010, but decreased in 2012 to levels below that of 2008. Thus, at the population level, the reduction in containers recycled occurred only among HF recyclers, whose costs are more sensitive to changes in number of containers recycled.

The increase in HF recycler cost per container clearly has implications on the handling fee payment, as does the increase in PF recycler cost per container. The handling fee payment is the difference between the cost to recycle for recyclers that receive handling fees (HF recyclers) and the cost to recycle for recyclers that do not receive handling fees (PF recyclers):

Handling Fee = HF Cost/Container – PF Cost/Container.

To determine the handling fee, we compare costs between similar samples of HF and PF recyclers. Both populations are stratified, with approximately one-third of containers recycled within each of the three strata. Because we utilize parallel sample designs, we can be assured that we are making an appropriate comparison, to the extent possible.

Because the handling fee payment is a differential between HF and PF costs per container, the relative cost changes in each are amplified. Between 2010 and 2012, HF recycler cost per container increased by 20 percent, compared to the PF recycler cost per container increase of 12 percent. The calculated 1.035 handling fee payment from this cost survey represents a 34 percent increase over the 0.773 cents per container calculated in the 2010 HF cost survey.[4]

The impact of the differential can move in both directions. For example, in the 2010 cost survey, the HF recycler cost per container decreased 8 percent as compared to 2008, and the PF recycler cost per container decreased 6 percent as compared to 2008. The calculated 2010 handling fee payment dropped 10 percent as compared to 2008. Similarly, between 2006 and 2008, HF cost per container declined 9 percent, PF cost per container declined 7 percent, and the handling fee declined 12 percent. While there are mathematical cases where the PF and HF differences in costs could result in a smaller change in the handling fee, we have not yet seen this situation in practice. In each of the four HF cost surveys, handling fee recycler costs changed in the same direction, and more than, processing fee recycler costs changed.

[4] The 0.773 cent per container payment was never utilized. CalRecycle continued the 0.89 cent per container handling fee paid in 2011. The calculated 1.035 cent handling fee is still 16 percent higher than the 0.89 cent per container handling fee.

The result has been greater changes in handling fee payment (down or up), as compared to the changes for either HF or PF recycler costs per container.

Figure 2-5
2006 through 2012 Full Populations, and 2012 Reduced Population
Number of Containers Recycled by Processing Fee Recyclers and Handling Fee Recyclers